INDEX.

Accident on railway between New York & Philadelphia—strength of cars..... 30
Adams, Dr H. W. Steam brick kilns..... 161
Air at high altitudes, carbonic acid in..... 67
Air, Diathermacy of. J. L. Hoorweg. Trans. by C. B. Dudley..... 44
Air. Formation of cloud in moist air..... 127
Anthracite coke..... 274
Asphalt pavement in England..... 165

Baird, G. W., U. S. Eng., Pneumatic Steering Gear..... 191
Bar at South Pass of the Mississippi. Capt. Jas. B. Eads..... 401
Bathometer. Deep Sea Sounding. Dr. C. W. Siemens..... 314
Benzine, Storage of. Editorial..... 224
Bibliographical Notices:
Building Stones. Maj. Gen. Q. A. Gillmore..... 88
Lippincott's Chemistry..... 392
Physics of Ether. Preston. W. B. Taylor..... 405
Roads, Streets, and Pavements. Maj. Gen. Q. A. Gillmore..... 296
The Elements of Graphical Statics. Prof. A. Jay DuBois..... 16
The Elements of Physical Geography. Prof. Edwin J. Houston..... 160
The Economy of Workshop Manipulation J. Richards..... 160
U. S. Centennial Gazetteer. Charles H. Kidder..... 160
Birkinbine, H. P. M., C. E. Gauging flow of Schuylkill River..... 321
Birkinbine, H. P. M., C. E. Rainfall on the Basin of the Schuylkill River..... 185
Blast-Furnace Tuyeres..... 7
Boiler, Harrison's Safety. Correspondence..... 152
Boiler, Mouchot's Solar..... 166
Boilers, Safety. Editorial..... 73
Boilers, Steam, and Chimneys. Robert Briggs, C. E..... 246
Brick Kilns, Steam. Dr. Henry W. Adams..... 161
Brick Machine. Cyrus Chambers, Jr..... 388
Bridges over the Penn. R.R. in Philadelphia..... 294
Bridges. Road Bridge in Fairmount Park. J. M. Wilson, C. E..... 17
Briggs, Robert, C. E. Double Blowing Engines..... 201
Briggs, Robert, C. E. Gas Works Engineering. Chemistry of Coal Gas..... 297
Briggs, Robert, C. E. Gas Works Engineering. Gas Holders..... 113
Briggs, Robert, C. E. Pseudo Perspective for Mechanical Illustration..... 12
Briggs, Robert, C. E Pumping Engines for Lowell Water Works..... 329
Briggs, Robert, C. E. Steam Boilers and Chimneys..... 246
Building Stones. Gen. Q. A. Gillmore. Bibliographical..... 88
Bunsen Burner. Prof. Henry Morton..... 8

Canal between the Caspian and Black Seas..... 366
Carbonic Acid in Air at high altitudes..... 67
Centennial Exhibition, and the Amer. Soc. of Civil Engineers. Editorial..... 150
Centennial Exhibition, the Opening of. Editorial..... 361
Centennial Supplements to Journal (proposed)..... 87
Chambers, Cyrus, Jr., on Brick Machines..... 388
Chemical Analysis, Use of the Microscope in. F. W. Very..... 135
Chemical Arts, Progress in. Dr. A. W. Hofmann..... 64, 117, 209, 262, 347, 413
Chemical Nomenclature. Prof. Henry Wurtz..... 404
Chimneys and Steam Boilers. Robert Briggs, C. E..... 246
Chimneys, Height of..... 43
Chimneys, Theory of Height of. Editorial..... 230
Circular Ironclads. Editorial..... 148
Cleemann, Thomas M., C. E. Strength of columns..... 221
Climbing a Standpipe..... 403
Cloud Formation in Moist Air..... 127
Coke, Anthracite..... 274
Columns, Strength of Material in. Thomas M. Cleemann, C. E..... 221
Commissions to Professional Purchasing Agents. Editorial..... 145
Cornish Pumping Engines..... 261, 313
Cotton Manufacture. Ring Frame Spinning. F. H Silsbee..... 89, 169

Davis, J. P., C. E. Pumping engine for Lowell Water Works..... 329
Diathermacy of Air. J. L. Hoorweg. Trans. by C. B. Dudley..... 44
Draper, Prof. Henry. Medal from U. S. Govt. Transit of Venus..... 8
DuBois, Prof. A. J. Elements of Graphical Statics. Bibliographical Notice..... 16
DuBois, Prof. A. J. Roof Truss, Determination of Strains upon..... 233
Dudley, Dr. C. B. Means of Distinguishing Ferments..... 129
Dudley, Dr. C. B. Translation of Diathermacy of Air. Hoorweg..... 44

Editorial:
American Soc. of Civil Engrs. and the Centennial Exhibition..... 150
Commissions to purchasing agents..... 145
Industrial Art..... 1
Massachusetts Institute of Technology..... 221
Opening of the Centennial Exhibition..... 361
Safety Boilers..... 73
Storage of Petroleum, Benzine, etc..... 224
Theory of Height of Chimneys..... 230
Use of Steam Carriages on Street Roads..... 217
Wear and Repairs of Pumping Engines..... 34

Eads, Capt. James B. Improvement of the South Pass of the Mississippi..... 391
Editorial, K. Circular Ironclads..... 148
Falls of St. Anthony, Engineering at..... 229
Ile's Differential Compass..... 149
Edson's Time and Pressure Recording Gauge..... 222
Electrical Induction, Phenomena of. So-called new Force. Prof. E. J. Houston. 59
Electrical Lighting..... 293, 432
Electrical Phenomena. Alleged New Force. Prof. E. J. Houston and Elihu Thomson..... 270

Electricity, Lighting by. A. Tolhausen..... 32
Ellery, R. L. J. Huygen's Parabolic Pendulum..... 258
Emery, Chas. E., C. E. Trial of Engines of U. S. Steamer Gallatin 102 and supplement.
Engine, Double Blowing. Robert Briggs, C. E..... 201
Engine, Giffard's Cold Air..... 144
Engine, Pumping at Hull, England..... 216
Engine, pumping, for Lowell Water Works. J. P. Davis and Robert Briggs, C. E. 329
Engineering, U. S., at Falls of St. Anthony..... 229
Engineers, Am. Soc. of, and the Centennial Exhibition..... 150
Engines, Cornish Pumping..... 261, 313
Engines, Pumping, Wear and Repairs of. Editorial..... 34
Engines, U. S. Marine. Trial of Steam Machinery of the Gallatin. C. H. Loring, U. S. Engineer, and C. E. Emery, C. E..... 102 and supplement.
Engines, Vertical Blowing. John Gjers..... 19
Errata. Note..... 77, 87, 404

Ferments, Means of Distinguishing. Dr. C. B. Dudley..... 129
Flame from Ignition of Gas, Original Publication of..... 86
Flying Machines, Penaud's. Prof. A. M. Mayer..... 193
Fog-Signals, American..... 37
Franklin Institute, Announcement of Lectures, Season 1875-6..... 6
Franklin Institute, List of Members..... i to xvi
Franklin Institute, Proceedings of Meetings, Dec., 1875, *to May*, 1876, *inclusive.* 9, 78, 156, 226, 289, 367
Freezing Mixtures..... 142

Gas Works Engineering. Chemistry of Coal Gas. Robert Briggs, C. E..... 297
Gas Works Engineering, Holders. Robert Briggs, C. E..... 113
Gauge, Edson's Time and Pressure Recording..... 222
Geyelin. Lecture on Turbines..... 279
Gramme Machine for Illumination..... 293, 432
Greene, B. R., C. E. Hill's Nautrigon..... 325

Harrison's Safety Boiler, Correspondence..... 152
Hewitt, Wm., M. E. Roll Trains, Efficiency of..... 302
Hill, Rev. Dr. Thomas. Nautrigon, for Determining a Ship's Position..... 325
Hofmann, Dr. A. W. Progress in the Chemical Arts..... 64, 117, 209, 262, 347, 413
Holtz Machine, Theory of. Prof. D. S. Stroumbo..... 356
Hoorweg, J. L. Diathermacy of Air..... 44
Houston, E. J., Prof., and Prof. Elihu Thomson. Electrical Phenomena..... 270
Houston, E. J., Prof. Electrical Induction, so-called New Force of Mr. Edison... 59
Houston, E. J., Prof. The Elements of Physical Geography..... 160
Hydrogen, Absorption of by Iron..... 231
Hydraulic Rivetter, Tweddell's..... 256

Ile's Differential Compass. Editorial..... 149
Illustration by Pseudo Perspective. Robert Briggs, C. E..... 12
Industrial Art. Editorial..... 1
Iron, Absorption of Hydrogen by..... 231

Iron and Steel, Engraving upon to show grain..... 257
Ironclads, Circular. Editorial..... 148
Iron. Efficiency of Roll Trains. Wm. Hewitt, M. E..... 302
Iron Industry in the U. S., Jan'y 1876..... 155
Iron, Melting of in Cupolas..... 154

Jamin, M. J. Curious Case of Magnetization..... 131
Jamin, M. J. Magnets..... 168

Kidder, Charles H. U. S. Centennial Gazetteer..... 160

Lead, Transformation to Galena..... 58
Lectures before the Franklin Institute, 1875-6..... 6
Lenses. How to Extend Capabilities of for Photographic use..... 132
Lenses. Lectures upon. Joseph Zentmayer..... 336, 421
Lighting by Electricity. A. Tolhausen..... 32
Loring, Chas. H., U. S. Eng'r. Trial of Engine of U. S. Steamer Gallatin. 102 and supplement.

Morton, Prof. Henry. Bunsen Burner..... 8
Magnetization, curious case of. M. J. Jamin..... 131
Magnets. M. J. Jamin..... 168
Massachusetts Institute of Technology..... 221
Mayer, Prof. A. M. Flying Machines..... 193
Medal, Transit of Venus, U. S. Govt. to Prof. Henry Draper..... 8
Members Franklin Institute, list of..... i to xvi
Metric System of Weights and Measures..... 153
Metric System of Weights and Measures. Reports of Committee..... 370, 381
Metric System of Weights and Measures. Remarks of J. W. Nystrom..... 385
Microscope, use of in Chemical Analysis. Frank W. Very..... 135
Mississippi River, South Pass of, Capt. Jas. B. Eads, C.E..... 391
Mouchot's Solar Boiler..... 166

Nautrigon, Hill's (Graphic Determination of a Ship's Place). B. R. Greene, C.E.... 325
Noctilucine (Phosphorescence of Animals). Dr. T. L. Phipson..... 68
Nystrom, J. W. Remarks on Report on Metric Weights and Measures..... 385

Pavement, Asphalt, in England..... 165
Pendulum (Huygen's Parabolic). R. L. J. Ellery..... 258
Perspective, Pseudo, for Mechanical Illustration. Robt. Briggs, C.E..... 12
Petroleum, Storage of. Editorial..... 224
Phipson, Dr. T. L. (Noctilucine)..... 68
Phosphorescence of Animals (Noctilucine). Dr. T. L. Phipson..... 68
Preston's Physics of the Ether. W. B. Taylor..... 405
Proceedings of Meetings of the Franklin Institute..... 9, 78, 156, 226, 289, 367

Railway Cars, American..... 30
Railway Improvement and Extension in Great Britain..... 231
Rail Rolling, in great lengths..... 116
Richards, J. The Economy of Workshop Manipulation..... 160
Rivetter, Tweddell's Portable Hydraulic..... 256

Roads, Streets, and Pavements, by Maj. Gen. Q. A. Gillmore. Bibliographical... 296
Roof Truss, Graphical and Analytical Determination. Prof. A. J. DuBois..... 233
Do. Errata..... 404
Roll Trains (Rolling Iron) efficiency of. Wm. Hewitt, M.E..... 302

Schuylkill River, Rainfall in. H. P. M. Birkinbine, C.E..... 185
Schuylkill River, Gauging its Flow. H. P. M. Birkinbine, C.E..... 321
Siemens, Dr C. W. Deep-Sea Sounding..... 314
Silsbee, F. H. Ring Frame Cotton Manufacture..... 89, 169
St. Anthony, Preservation of Falls of. Editorial..... 229
St. Gothard Tunnel..... 229
Steam Boilers. See Boilers.
Steam Carriages. Use of on Streets, Roads. Editorial..... 217
Steam Engines. See Engines.
Steering Apparatus—Pneumatic. G. W. Baird, U. S. Engineer..... 191
Strength of Material in Columns. Thos. M. Cleemann, C.E..... 221
Stroumbo, Prof. D. S. Theory of the Holtz Machine..... 356
Sugar Cane, Varieties of..... 213
Sugar Tell-Tale (overflow of vacuum pan) Liquor..... 215
Supplements to Journal, proposed Centennial..... 87

Taylor, W. B. Physics of the Ether, by Preston..... 405
Technical Terms..... 245
Telegraph Cables, Breakage of..... 232
Telegraph. Testing of Deep-Sea Cables..... 393
Telegraph, Underground, in London..... 181
Thomson, Prof. Elihu (and Prof. E. J. Houston), Electrical Phenomena..... 270
Tubes, Manufacture of Large Size..... 87
Tunnel, St. Gothard..... 229
Turbines, Lecture upon. Emile Geyelin..... 279
Tweddell's Hydraulic Rivetter..... 256

Very, Frank W. Use of the Microscope in Chemical Analysis..... 135

Wilson, J. M., C.E. Road bridge in Fairmount Park..... 17
Wurtz, Prof. Henry. Chemical Nomenclature..... 404

Zentmayer, Joseph. Lecture on Lenses..... 336, 421